## CLAIMS

1. A stent adapted for location exteriorly of a blood vessel, **characterised by** the stent being formed in such manner as to be locatable around and in morphological relationship with the said blood vessel, and means for maintaining the stent in such relationship with the blood vessel.

2. A stent according to Claim 1 **characterised in that** the stent is in the form of a sleeve in at least two parts, the sleeve being of generally cylindrical form.

3. A stent according to Claim 2 **characterised in that** the sleeve includes one or more sections of varying form in order to conform to the morphological requirements in any particular case.

4. A stent according to any one of the preceding claims **characterised in that** the sleeve is provided with appropriately located recesses or apertures for accommodating other interconnecting arteries.

5. A stent according to any one of the preceding Claims 2 to 4 **characterised in that** the sleeve of the stent is provided with a base or flange portion for attachment to a main heart structure, for example the ventricle muscle, such that a securement or anchor point is established for the stent, the base or flange portion being adapted for appropriate attachment to the said structure.

6. A stent according to any one of the preceding claims 2 to 5 **characterised in that** the interconnection of the parts of the sleeve is effected by a hinge mechanism with releasable latches provided at the mating edges of the parts.

7. A stent according to any one of the preceding Claims 2 to 4 **characterised in that** the sleeve is of resilient material slit longitudinally to allow it to be expanded over the wall of the artery and then to recover its original condition, the sleeve being suitably clampable in position embracing the artery in the said morphological relationship.

8. A stent according to Claim 7 **characterised in that** the clamping is achieved by the application of suitable ties.

9. A stent according to Claim 8 **characterised in that** the sleeve is provided with one or more grooves for receiving and locating the ties.

10. A stent according to Claim 7 **characterised in that** the clamping is effected by the insertion of a locking pin extendable through hinge elements provided at the mating edges of the slit in the sleeve.

11. A stent according to Claim 5 and any claim dependent thereon **characterised in that** the sleeve of the stent is of varying thickness with the greatest thickness being provided in the base or flange region thereof.

12. A stent according to Claim 11 **characterised in that** the thickness reduces away from the base or flange region to afford a degree of flexing given the need to accommodate the pulsing of the blood through the artery.

13. A stent according to any one of the preceding claims 2 to 12 **characterised in that** the sleeve has an outer casing and a

relatively inner casing, the outer casing being of more rigid construction than the inner casing which latter is configured to provide flexure.

14. A stent according to Claim 13 **characterised in that** the inner casing is of petal-like form to encompass the artery but to allow flexing.

15. A stent according to Claim 1 **characterised by** at least one spiral part adapted in use to locate over and coil around the blood vessel to provide in position the morphological relationship with the blood vessel.

16. A stent according to Claim 15 **characterised in that** each spiral part is provided with interengaging means for connection to an adjacent part.

17. A stent according to Claim 16 **characterised in that** the interengaging means is a screw connection adapted to tighten the coil around the blood vessel.

18. A stent according to any one of Claims 15 to 17 **characterised in that** in position around the blood vessel the spiral part forms an open coil or a closed coil.

19. A stent according to any one of the preceding claims **characterised in that** the inner surface of the stent is of a smoothness to ensure that no fretting or abrasion occurs and the external surface of the stent is tolerant of other adjacent body parts.

20. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is produced is translucent for the purposes of allowing non-intrusive investigative procedures to take place.

21. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is produced is resistant to the effect of electro-magnetic fields.

22. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is produced is thermally stable and is biocompatible.

23. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is made contains antibiotics gradually releasable in time, the antibiotic elements being incorporated during the manufacture of the stent.

24. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is made is polymeric, metallic, or ceramic or appropriate mixtures thereof.

25. A stent according to any one of the preceding claims **characterised in that** the material from which the stent is made is a heat shrink plastics material recoverable in terms of shape either immediately or over a period of time to produce the morphological fit.

26. A stent according to any one of the preceding claims **characterised in that** the size of the stent is adjustable in situ.

27. A method of manufacturing a stent for morphologically fitting a blood vessel according to any one of the preceding claims, the method **characterised by** the steps of producing a 3D computerised model from a scanned image of the blood vessel to which the stent is in practice to be applied, and rapid prototyping the computerised 3D model in an appropriate material to provide the stent or a mould for the stent or a precursor thereof for morphologically matching the blood vessel.

28. A method according to Claim 27 **characterised in that** the scanned image is obtained from a procedure selected from the following: MRI, MRA, X-ray CT, 3D pulsed Doppler Echo imaging or an equivalent of any one of the foregoing.

29. A method according to Claim 27 or 28 **characterised in that** the computerised 3D model is generated using computer-aided design software.

30. A method according to any one of the preceding Claims 27 to 29 **characterised in that** the computerised 3D model is employed in the rapid prototyping step to generate the stent in the form substantially in which it is to be deployed in a surgical procedure.

31. A method according to any one of the preceding Claims 27 to 29 **characterised in that** the computerised 3D model is employed in the rapid prototyping step to generate a precursor to the stent, a mould is taken of the precursor, and the stent is then formed in the mould.

32. A method according to Claim 27 **characterised in that** a stent is produced by embroidering the 3D image onto at least one 2D

substrate element, and then forming the stent around the blood vessel with the substrate element or substrate elements and fixing them together to provide the stent.

33. A method according to Claim 27 **characterised in that** a stent is formed of polymeric material produced to conform morphologically to the 3D image in the form of a thin shell, embroidering a woven structure onto the shell, and removing the shell following completion of the embroidery to provide a stent constituted by the thus produced embroidered structure which is morphologically created thereby.

34. A method according to Claim 27 **characterised in that** a stent is formed of polymeric material produced to conform morphologically to the 3D image in the form of a thin shell, the shell is mounted in a computer numerically controlled machine having multiple axes control, and the shell is machined to provide appropriate perforations to accommodate subsidiary blood vessels.

35. A method according to Claim 27 **characterised in that** a stent is formed by embroidering a substantially flaccid former representing the 3D morphology of the blood vessel, thereby to generate the stent as a woven structure.

36. A stent produced by the method according to any one of the preceding Claims 27 to 35.